

## CHAPTER 8

# BREADS AND DESSERTS

This chapter deals with basic baking terminology, ingredients, and the procedures used to produce breads and desserts. To bake a satisfactory product, you must have a thorough knowledge of these terms, ingredients, and baking procedures.

### BREADS

The term *bread* has been used for centuries to describe a mixture of flour, sugar, shortening, salt, and liquid. This mixture is made into dough, then yeast is added to the mixture to make the dough rise.

Two kinds of bread are used in the general mess (GM). One kind includes yeast breads such as yeast-raised breads and rolls, sweet-dough rolls of various kinds, coffee cakes, doughnuts, pizza, and quick breads. The other kind includes products leavened by chemical leavening agents such as baking powder. Some of these products are biscuits, muffins, pancakes, cake doughnuts, quick coffee cake, and corn bread.

Bread is the most important food produced by the baker. It is prepared in greater quantities than any other baked product. High quality and excellent taste should be maintained regardless of the amount of bread baked.

### YEAST-RAISED BREADS

The production of yeast-raised products, especially bread and sweet doughs, is considerably more involved than the production of other bakery products. If the ingredients are of good quality, used in specific amounts, and are properly mixed, using proper temperatures, the doughs will yield good quality products.

#### Ingredients

The baker must understand the functions of each basic baking and breadmaking ingredient used in bakery products. He or she should then use the ingredients properly (manner of mixing and amount used). The functions of these ingredients are explained next.

**FLOUR.**— Flour is a mixture of starch, protein, and other materials. The kinds of flour used are described as follows:

- General-purpose flour is a mixture of hard and soft wheat flours. It is used to make cakes, cookies, quick breads, pastries, and pies. It does not have enough gluten strength to make satisfactory yeast bread and rolls.

- Bread flour is a blend of hard wheat flours. It contains more protein than general-purpose flour and has a slight granular texture. Good quality bread and other yeast-raised products can be made only with bread flour.

- Wheat base is prepared from the wheat germ, bran, and other fragments of wheat kernels. It has a whole wheat flavor and may be combined with flour to produce whole wheat bread.

In addition to the protein, flour contains various food elements such as carbohydrates, water, minerals, vitamins, enzymes, and fat. The amount of these elements contained in the flour varies with the type, grade, and storage period of the flour.

**Protein.**— The two principal proteins present in wheat flour (gliadin and glutenin), when combined with moisture, form gluten that gives structure to batters and doughs. Gluten also gives the dough expansion qualities.

**Carbohydrates.** — Carbohydrates in flour are usually in the form of starch that absorbs water and helps give bulk to dough. Flour that is especially made for cakes and pastries is rich in carbohydrates.

**Water.**— Wheat flour usually contains from 9- to 15-percent moisture. Flour absorbs or loses moisture in storage, depending on the atmospheric conditions.

**Minerals.**— Minerals are contained in the bran coat and the germ of wheat, and most of the minerals are lost when wheat is made into white flour. These minerals are returned to flours that are enriched.

**Vitamins.**— To replace the food value lost in milling, vitamins and minerals such as thiamin, niacin, iron, and riboflavin are frequently added to flour. Flour treated in this manner is known as enriched flour.

**Enzymes.**— An enzyme is a very minute substance produced by a living plant. The mere presence of an enzyme brings about certain changes in the composition

of a material. Diastase and protease are the most important enzymes found in flour. Diastase converts starch to sugar, and the yeast acts upon the sugar to produce carbon dioxide and other fermentation products. Protease softens the gluten and, when this enzyme is lacking, the dough will not have the desired elasticity.

**Fat.**— Wheat flour contains approximately 1.5-percent fat. The major portion of the fat of wheat grain is removed during the milling process. Although the fat content of flour is very low, this is what causes flour to become rancid if flour is stored for long periods under warm and humid conditions.

**WATER.**— In many bakery products, including bread, the amount of water used is second only to the amount of flour. Water contains minerals. The amount and kind of minerals contained in the water vary from one part of the country to another. These variations affect the properties of the dough and the finished bread.

Water is necessary to form gluten from the protein of flour, thereby giving the dough its elasticity and its gas retaining property. Gluten absorbs twice its own weight of water. The amount of water used determines the consistency and the temperature of the dough after it is mixed. Water dissolves the salt and the sugar, makes it possible for the enzymes to act, and holds the yeast in suspension until it is added to the other ingredients and the fermentation begins.

**SALT.**— Very little salt is used in making bread, but the amount used is essential, for it performs a very important function. Without salt, fermentation in dough is too rapid, and the baked product becomes too coarse. With too much salt, the fermentation process is slowed, and the bread becomes soggy. Salt strengthens gluten and helps it to expand, improves the color of baked products, and enhances the flavor.

**SUGAR.**— During fermentation, part of the sugar is converted into a form that can be used as food for the yeast. Starches are converted into sugar that produces carbon dioxide gas and alcohol and that causes the dough to expand, making it softer and more flexible.

This sugar in the bread contributes to the color of the crust, the taste of the baked loaf, the toasting qualities of the bread, the texture, the moisture retaining qualities, and the nutritional value. Sugar is also a tenderizer.

All sugars do not have the same degree of sweetness, since sweetness depends upon the refining process through which the sugar has passed. Brown sugar, for example, is less highly refined than white

sugar and, therefore, is not so sweet. Brown sugar lends a pleasant taste to cooked or baked products, and syrups can be used as a substitute for regular sugar. Corn syrup, honey, or molasses improves the flavor of cookies and helps retain their moisture.

**SHORTENING.**— Shortening is the animal or vegetable fat that is used in baking. There are two general types of shortening—solid and liquid. The solid-type shortening is recommended for use in bread dough because it can be more thoroughly distributed through the dough. The reason for this is that it will not saturate the flour it touches. Although the liquid-type shortening can be used effectively, the dough must be well formed before the oil is added. The liquid-type shortening is mainly used in recipes that call for melted shortening, such as some cake and bread recipes.

Shortening compounds are composed of deodorized animal and vegetable fats mechanically blended to give a final product of acceptable elasticity and satisfactory baking quality. There are two types of solid shortening compounds used in the Navy GM—general-purpose shortening and bakery shortening (emulsifier-type).

**General-Purpose Shortening.**— General-purpose shortening is a high-grade shortening that has excellent baking qualities. General-purpose shortening should not be substituted in recipes that specify bakery-type shortening.

**Bakery Shortening.**— Bakery shortening or emulsifier-type shortening is hydrogenated shortening to which an emulsifying agent has been added. This gives the shortening exceptional ability to blend with other ingredients.

**SALAD OILS.**— Salad oils are generally used in the preparation of salad dressing and in recipes that specify oil. Oil should not be substituted for general-purpose or emulsifier-type shortening in recipes specifying those types.

**BUTTER.**— Butter is the fatty constituent of milk that is separated from the other milk constituents by churning. Butter is used most often as a spread, but it has many other uses in food preparation. When butter is substituted for other shortening, you should adjust your recipe. Butter contains salt, milk, and moisture so the salt, milk, and liquid in the recipe should be decreased accordingly. The fat content of butter is less than that of other shortening; therefore, more butter should be used in the recipe.

**MILK.**— Milk is almost a complete food. Nonfat dry milk contains all the food qualities of whole milk

except fat. In bread production, nonfat dry milk style A should be used, as this milk is designed specifically for achieving volume, flavor, and crust characteristics desirable in yeast breads. Dry milk can be added by mixing or sifting the milk and flour together, or it can be reconstituted with part of the water in the bread recipe and added to the dough. In either event, it is important that there are no lumps of milk powder in the dough.

The amount of milk used in the dough can be as high as 6-percent nonfat dry milk based on the weight of the flour. The use of more than 6-percent dry milk in the bread dough is detrimental to fermentation. Milk improves the texture, flavor, and keeping quality of bread.

**EGGS.**— Eggs are not used in making white bread but are used in making sweet doughs, cakes, and cookies. In baked products, eggs supply a high protein, mineral, and vitamin content. The yolks add color, the whites help bind other ingredients, and both combine to add flavor and moisture to the bread.

Fresh eggs should be removed from the refrigerator and warmed to room temperature before they are used in dough. Frozen eggs should be completely defrosted before they are added to the dough and should be well mixed. Dehydrated egg mix may be sifted with the dry ingredients in some baked products containing a high percentage of dry ingredients; the water needed to reconstitute eggs should be added to the required liquid. Reconstituted eggs should be used within 1 hour after they are reconstituted or returned to the refrigerator until they are to be used. Do not hold them overnight.

## Leavening Agents

Leavening agents are gases that cause the dough to rise. The gases are produced by chemical action or introduced by the mixing process, which forces air into the dough. The common types of leavening agents are steam, air, and carbon dioxide gas. These agents are produced by yeast or baking soda or baking powder.

**AIR.**— Air is introduced into the dough by blending (creaming) fat and sugar together, by sifting flour, or by folding in beaten egg whites that already contain air. Steam is used to leaven eclairs and cream puffs.

**YEAST.**— Yeast is a microscopic, one-celled plant that, when conditions are favorable, will multiply by budding or by the division of a cell into two cells. In this process of reproduction, the yeast plant uses available food (sugars) to produce carbon dioxide gas and alcohol. This is known as fermentation.

**ACTIVE DRY YEAST.**— Active dry yeast should be suspended in about seven times its weight of water at 105°F to 110°F for 5 minutes before it is used. The proper temperature of the water is important, as water that is too cold or too hot will harm the yeast. Make sure the temperature of the water does not exceed 110°F. Active dry yeast does not require refrigeration, but should be stored in a dry and reasonably cool place. When properly stored, dry yeast will keep for many months.

Yeast foods, known as dough conditioners, have other more important functions than to supply food for yeast. Their major purposes are to condition the water and to assist in the proper fermentation of the dough.

Yeast foods contain three types of functional ingredients:

1. Ammonium salts to supply yeast with a supply of nitrogen for growth
2. Calcium salts to produce the correct amount of hardness in the dough water and to firm the gluten
3. An oxidizing agent to give a firmer, less sticky dough

In addition, yeast foods contain starch and salt to add bulk and make weighing easier. The use of yeast foods is often determined by the strength of the flour and the fermentation period desired. Not all flours require yeast food. When the flour requires such material, its addition produces bread of larger volume, better grain and texture, and improved loaf appearance. Too much will produce inferior bread with low volume and coarse grain.

**BAKING SODA.**— Baking soda acts as a leavening agent only when there is an acid present. Some of these acids are sour milk or buttermilk, molasses, brown sugar, honey, corn syrup, maple syrup, lemon juice, and vinegar. These are used for different types of quick bread. Only a limited quantity of the acid ingredients can be used for leavening purposes due to the pronounced flavor and heavy texture that baking soda and molasses or syrup give to the products. It is also difficult to determine beforehand the amount of gas that these mixtures will produce. Thus, it is difficult to obtain standard results.

**BAKING POWDER.**— Baking powder is a leavening agent that contains baking soda, a large amount of starch, and a material that forms an acid when it is mixed with water, thus producing a gas. There are several types of baking powder. The Navy uses a

combination-type baking powder that contains the acids sodium aluminum sulphate (S.A.S.) and orthophosphate plus sodium bicarbonate and a cornstarch filler. This type of baking powder is moderately double acting; one constituent acts in the batter, while the other does not act until it is heated in the oven. Baking powder is generally preferred over baking soda because it is more reliable.

## General Breadmaking Procedures

The processes described next include not only the steps that you, the baker, perform, but also the processes that take place within the dough as a result of your action. When actually preparing bread, you should always follow the steps and procedures in the *Armed Forces Recipe Service* (AFRS).

**MIXING.**— After you select and weigh or measure the necessary ingredients, the next important step is mixing. Dough may be mixed by hand, but an electric mixer or a bread-dough machine will make the job easier.

**Dough Temperatures During Mixing.**— Temperature has a definite influence on the function of yeast and its ability to condition a dough properly to produce a quality bread. The desired dough temperature (DDT) is obtained from the recipe card.

The temperature of the dough can be regulated by considering all the factors that will influence the temperature of the dough and then using water at a temperature that will offset the adverse temperatures. Any desired temperature of the dough when it leaves the mixer may be obtained by a rather simple calculation that first determines the friction factor (temperature rise induced by mixing) and may then be used at all times when the same mixer and the same weight of dough are used.

Determine the friction factor by competing the following steps:

1. Add the temperature of the room, the temperature of the flour, and the temperature of the water.
2. Multiply the temperature of the mixed sample dough by 3.
3. Subtract the first answer from the second answer.

For example:

Step 1. Temperature of room . . . . .	75°F
Temperature of flour . . . . .	73°F
Temperature of water., . . . . .	+54°F
	<hr/> 202°F
Step 2. Temperature of mixed dough . . . . .	74°F
	x3
	<hr/> 222°F
Step 3 . . . . .	-202°F
Friction factor . . . . .	<hr/> 20°F

Adjusting the temperature of the water used in the dough will control the temperature of the dough. To determine the desired water temperature you add the temperature of the room, the temperature of the flour, and the friction factor and subtract this total from the DDT multiplied by 3. You will then have the desired water temperature. For example:

Step 1. Temperature of room. . . . .	75°F
Temperature of flour . . . . .	73°F
Friction factor . . . . .	+20°F
	<hr/> 168°F
Step 2. 80°F (DDT) x 3 . . . . .	240°F
	<hr/> -168°F
Desired water temperature . . . . .	<hr/> 72°F

The individual recipe will indicate the temperature of the water to be used in the mixing process. By following the procedures just discussed, and using a thermometer to assure the proper temperature of water being used, the final mixed dough temperature will be that which was desired.

**Mixing Operation.**— The mixing operation accomplishes two functions. First, thorough mixing distributes the ingredients evenly. Secondly, it stretches the dough until the gluten is fully developed and distributed.

In the early stages of the mixing process, water wets the flour and the dry ingredients. At this stage, the dough will be rather wet and lumpy. As the mixing progresses, the flour continues to take up liquid and the dough becomes moderately firm.

When you are using high-speed mixers, the dough will become firm after several minutes of mixing, hut the dough has no stretching characteristic. As mixing continues, the dough begins to bond and becomes more elastic. The lumpiness disappears and the dough becomes more firm as the flour picks up more moisture. At this stage, the dough is rather sticky and sticks to the mixer bowl quite easily. Next, the dough becomes less

sticky and more elastic. When this happens, the back of the bowl begins to be cleared of dough and eventually becomes completely clear. At this time you should use careful judgment not to allow the mixing to progress too far or the dough will breakdown to a point where it loses elasticity and becomes sticky and runny. There is no rule governing the mixing time for dough other than the feel and appearance of the dough. When the mixing process is completed, the temperature of the dough should range between 78°F and 82°F.

**FERMENTATION.**— After the mixing operation, the dough is either left in the mixing bowl or placed in a dough trough to ferment.

Fermentation is the chemical change that takes place when yeast (or other leavening agent) in the bread releases carbon dioxide gas, causing the dough to rise. The fermentation period is the time that elapses between the mixing of the dough and the time the yeast is killed by the oven heat. The correct temperature for the dough during fermentation is indicated on the recipe card. A higher temperature will cause the growth of undesirable bacteria (wild yeast) and excessive acidity, which will result in a coarse-grained bread of poor flavor.

The length of the fermentation period depends on the amount of yeast used, the strength of the flour, and the temperature during fermentation. Too much yeast and higher temperatures than those designated cause the dough to rise too fast. Insufficiently fermented or conditioned dough is called “young dough” while that which has fermented too long is known as “old dough.”

**PUNCHING.**— Punching the dough after it rises develops the gluten and also redistributes the yeast cells. The temperature of the dough is equalized, and some of the carbon dioxide gas is forced out. Yeast dough is ready for punching when it is light and approximately double in size. To test the dough to determine if it is ready for punching, press the dough lightly with a fingertip. If the impression closes up immediately, the dough is not ready. If the impression recedes slightly, it is ready to be punched or folded. The dough should then be punched.

To punch the dough you should use both hands and punch the dough through the center, going from end to end of the dough trough. Then, use both hands to grasp one side of the dough and pull it on top, once again working from end to end of the dough trough. To punch dough in a mixing bowl, punch the center, fold sides into the center, then turn completely over. After the dough has rested for approximately 30 minutes, it should be taken from the bowl or trough to the bench for makeup.

**DOUGH MAKEUP.**— The dough is divided into uniform pieces of the desired weight. When you are dividing the dough by hand, cut off the dough with the dough scraper and weigh the dough on a scale. Use the scraper to add or remove dough until the desired weight is obtained. This process is referred to as scaling. In a machine-operated bakeshop, the baker scales the pieces by machine, making adjustments so that the pieces will be the desired weight.

**ROUNDING THE DOUGH.**— After scaling, the dough is rounded by tucking the raw edges and forming a smooth round ball. This process seals the raw edges that are left after the dough is divided.

**INTERMEDIATE PROOFING.**— The intermediate proofing period is a stage when the rounded piece of dough is allowed to rest between the time it is divided and rounded and the time it is formed for panning. The intermediate proofing period should be just long enough for a piece of dough to recover from being divided and rounded. The dough should be loose enough so that it can be easily molded. This requires from 12 to 15 minutes, depending on the dough and the conditions of the room.

Some of the advantages of rounding and giving the dough intermediate proof are it achieves uniform shape, facilitates panning, makes texture uniform, stretches gluten slowly, expels excess gas, and forms skin on surface of dough.

**MOLDING AND PANNING.**— The pieces of dough are shaped so that they can rise in the pan and form a shaped loaf of bread. Use the following steps in hand molding:

1. Place each piece of dough on the board, top side down. Use as little dusting flour as possible.
2. Press the gas out of the dough and pull lengthwise carefully, shaping the dough into an oblong loaf about the length of a finished loaf of bread.
3. Flatten the dough with your hands or with a rolling pin.
4. Shape the dough by folding in the ends to form a rectangle.
5. Fold the dough lengthwise to the center and seal by firm finger pressure.
6. Fold over the other half of the dough and press for additional seal.
7. Roll the dough to complete the sealing and molding of the loaf.

After the dough is molded into a loaf, place it in a lightly greased pan. Each loaf should be placed so that the molding seam is on the bottom, and the loaf should be long enough to reach the ends of the pan. Figure 8-1 provides an example of the molding and shaping of dough into a loaf.

**PAN GREASING.**— The primary purpose of lightly greasing the bread pan is to prevent the bread from sticking when it is removed. Too much grease on the pan surface can seriously affect the proofing, baking, and slicing of the bread.

**PAN PROOFING.**— After shaping and panning, loaves should be placed in a properly controlled room or cabinet called the proof box or proof cabinet for the final proof or pan proof. Temperature of the cabinet should be maintained at 90°F to 100°F. During pan

proofing, the action of the yeast is speeded up by the higher temperature and the gluten becomes more mellow and elastic.

To determine whether the loaf is properly proofed, touch it lightly with one fingertip and press in slightly. If the impression made by the tip of the finger remains, the loaf is proofed. If the imprint does not remain and fills out when the fingertip is removed, the loaf is still too compact and should be proofed more. Usually, 50 to 75 minutes is sufficient.

**BAKING.**— The final stage in bread production is to place the pans of dough in an oven that is heated to a temperature sufficient to heat the dough quickly (temperature specified on AFRS recipes) and to cause the carbon dioxide of the dough to expand, thereby greatly increasing the size of the dough. The oven

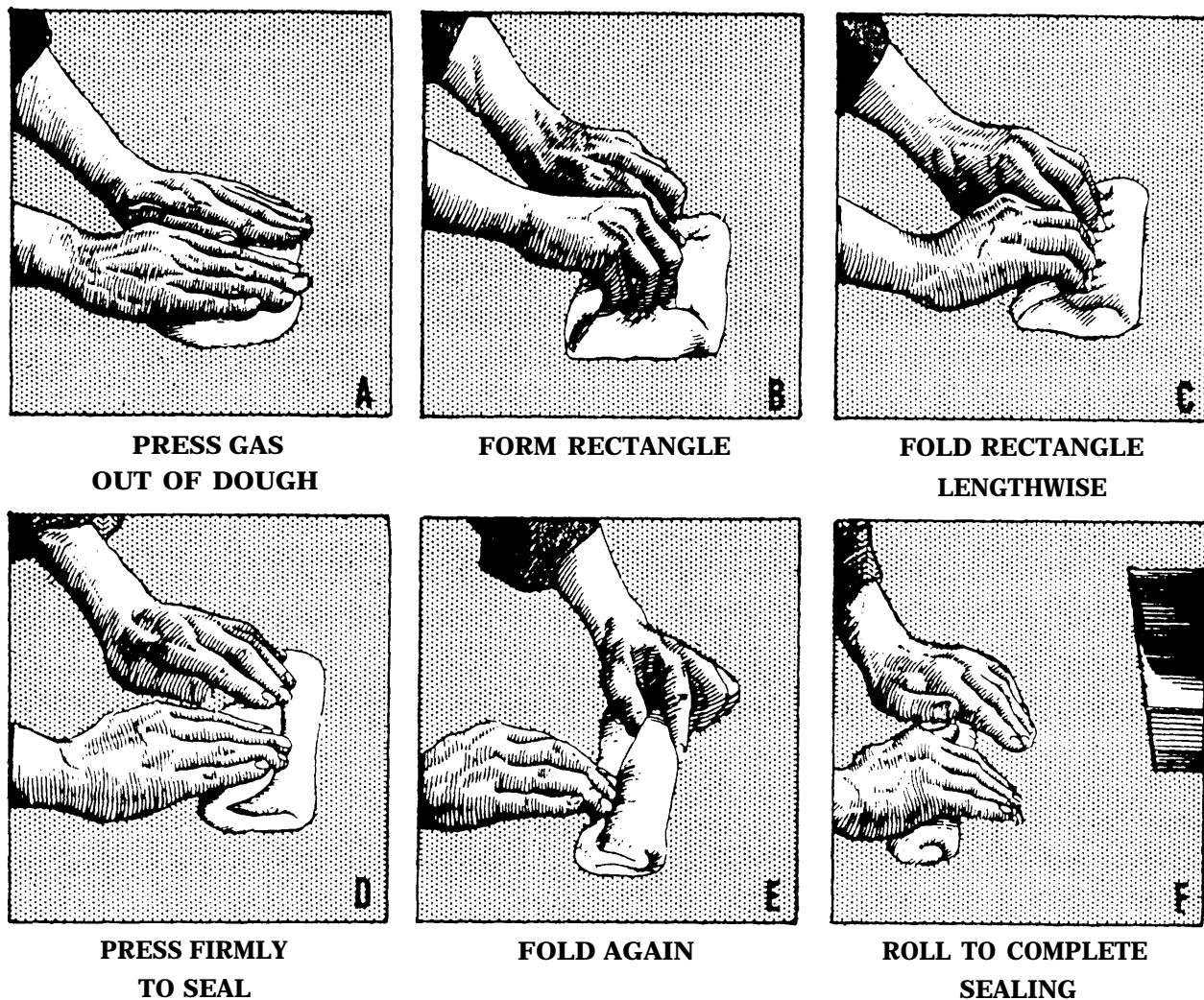


Figure 8-1.-Molding and shaping bread dough.

temperature also vaporizes moisture on the surface of the bread and ultimately causes caramelization of the sugars, starches, and other ingredients that make up the exposed dough surface. The oven temperature and the time required to bake a loaf of bread will vary, depending on several factors. When using convection ovens, follow the operating manual instructions or use the AFRS guideline card for convection ovens. Baking time is shorter and temperature is lower in a convection oven than in a conventional oven. Remember that some bread recipes will contain convection oven information as a note.

Bread is the end product of a long line of chemical and physical reactions. If the loaf is removed from the oven before these changes occur, no matter what crust color is obtained, the loaf will lack desirable qualities. Color and thickness of crust depend on the length of time the loaf is subjected to oven temperature and on the concentration of sugars. Aroma of underbaked bread is "green," lacking the full-scale, delicious fragrance characteristic of freshly baked bread. If sufficiently underbaked, the loaf sides will collapse and proper slicing is not possible.

The oven temperature may be controlled for the purpose of influencing bread character in other ways than just the color. A low oven temperature tends to open the grain of the loaf. If too high a temperature is used, the loaf may burst in a rather violent manner, usually along the sides, that results in a misshapen loaf.

A properly baked loaf of bread sounds hollow when tapped. Remove the baked loaves of bread from pans and cool on racks in areas free from drafts. Bread will dry out more quickly if the air is either too warm or too dry.

**COOLING.**— After the bread is done, remove the loaves from the pans and place them on racks to cool, making sure there is at least a 1-inch space between loaves. Cooling usually takes from 1 1/2 to 2 hours. Bread should not be covered while it is warm

**STORING AND SERVING.**— Bread should be stored at cool room temperature under conditions where it will not dry out. If wrapped in plastic bags that are closed with twist ties, bread can be stored for up to 96 hours in a cool room. If the room is hot and humid, it may be necessary to store the bread under refrigeration to prevent mold from forming. Refrigeration is not ideal, however, for extended storage because bread stales more rapidly under refrigeration than it does at room temperature. This staling makes the bread firm and the crumb becomes coarse and hard. Bread may be

held for extended periods if frozen in plastic wrap or bags. If freezer storage is impractical, bread quality is best maintained by baking in quantities that will be consumed within 48 hours.

The bread storage should be arranged so that the older bread always can be used first. Sliced bread left over from a previous meal can be thoroughly dried and used for bread crumbs, bread pudding, or crouton preparation.

**SHORT-TIME FORMULA.**— This formula was developed to meet a critical need aboard Navy ships with limited bakery space. The short-time formula eliminates both the intermediate proof and the final loaf-molding operation. This modified sponge-type dough produces a good loaf of bread.

More importantly, ships without production equipment can produce bread within 2 to 2 1/2 hours. In addition to eliminating the 8- to 10-minute intermediate proof, the baker can roll the rounded pieces into a sausage shape and pan—one person being able to roll and pan an average of 20 per minute. Hot rolls and variations may be prepared using the short-time formula. Follow the AFRS for best results.

A room temperature of 80°F should be maintained to assure the desired finished product. Any increase in the bakeshop temperature will, of course, reduce the fermentation time. Because of the absence of fermentation rooms aboard ship, this control is strictly dependent on the baker's skill and knowledge in determining the readiness of the dough. Mixing time will not change, however, as the 10-minute periods appear to be optimum for proper dough development under practically all conditions.

**UNDESIRABLE CONDITIONS.**— Certain undesirable conditions may develop in the baking and storing of bread that will not only spoil individual loaves and batches but will infest the bakery and continue to destroy subsequent bakings. Sanitary precautions against these conditions are particularly necessary in hot, humid climates.

**Rope.**— Rope is an undesirable condition of bread caused by bacteria. The crumb of the loaf deteriorates, darkens, and becomes sticky and wet. If the loaf is pulled apart, long wet strands will appear as it separates. Rope has an odor similar to overripe cantaloupe.

The rope spores that are formed from the active rope bacteria cells are highly resistant to heat, and any that may be near the center of the loaf will not necessarily be killed by baking.

Temperatures of 86°F and above, particularly temperatures of 95°F to 105°F, promote the development of rope. When the climatic condition is such that the shop temperature is high, rope could develop even in doughs that are lower in temperature than 85°F. In the tropics, high humidity often accompanies high temperature. This increases the danger of rope developing in the bread. Also, doughs that are not sufficiently acid are highly subject to rope infection. Since acidity is normally increased through fermentation, an overly warm dough may not have time to become sufficiently acid to retard the development of rope.

When the weather or climate is hot and humid, you should keep a sharp lookout for the appearance of rope and do everything in your power to prevent its development. By controlling the temperature of the doughs, you can keep them cold enough to retard the development of rope. A mold-preventive inhibitor can be added to the bread dough. To prevent the development of rope, you should take the following precautions:

- Baking ingredients should not be kept in the shop longer than necessary, and those that are kept should be arranged in such a way as to allow free circulation of air around them.

- The bread-baking schedule should be planned so that the bakery is not overstocked; this would result in some of the bread becoming old in the shop or in the storage room.

- Bread that has accumulated and has become stale may be used for croutons and crumbs.

- All bread should be thoroughly cooled before it is stored.

- Keep equipment scrupulously clean and see that no pieces of previous doughs are allowed to remain in the shop. The shop and all equipment should be thoroughly cleaned as soon after it is used as possible.

In the event that rope does develop in your shop, it will be necessary to kill all the rope bacteria before you do any more baking. Generally, you should take the following precautions:

- Dispose of all baked products and baking ingredients in the shop.
- Thoroughly clean the shop and all the equipment.
- Wash the bulkheads, decks, and overhead with hot soapy water and rinse them thoroughly.

- Remove all foreign matter from all equipment and tools and from the cracks and seams in the oven.
- Sterilize the workbench and all small equipment.
- Rinse down everything a second time with a strong vinegar and water solution.

**Mold.**— Mold is composed of tiny plants that are visible to the naked eye. There are many types of mold that vary in form and color. They form velvety, colored spots on the bread and create a musty odor. Mold spores are present in the air and will become visible on most any food substance if they are given sufficient time under proper conditions to develop. Mold will multiply in a warm, humid atmosphere or on moist food. The absence of light and sufficient time also contributes to their growth. Mold first appears on the side of the loaf.

Mold is not resistant to heat; therefore, mold that may be present in baking ingredients will probably be killed during baking. This means that any mold on the baked bread is a result of improper handling of the bread after it is baked.

To prevent the formation of mold in the bakeshop, take the following precautions:

- Keep the shop clean and dry.
- Assure proper circulation of air in the shop.
- Make sure all areas are lighted.
- Bake bread thoroughly and cool properly before storing it.
- Always avoid handling the bread with wet or damp hands.
- Make sure bread is not kept for any length of time, since bread molds very quickly in storage.

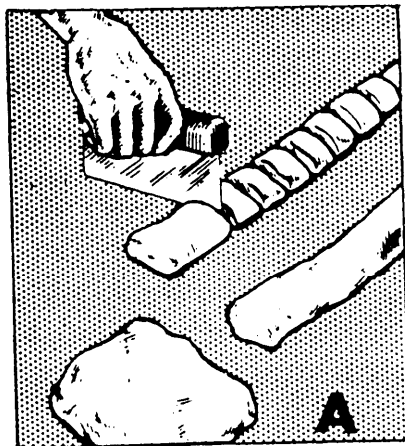
## ROLLS

Several types of hot rolls can be made from the basic recipe in the AFRS.

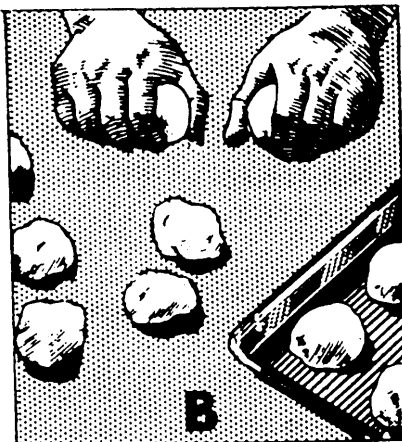
The method of making rolls is the same as that used for making bread. However, less mixing is required and the dough is much softer. Careful handling of the dough will assure light, tender rolls.

To make up the rolls, take the following steps (see fig. 8-2):

1. Divide the dough into 3- or 4-pound pieces.



**CUT STRIPS**



**ROUND EACH PIECE**



**FLATTEN ROLLS  
TO DESIRED THICKNESS**



**ELONGATE  
WITH ROLLING PIN**



**FOLD AND PRESS TOGETHER  
INTO SMALL PIECES**



**READY TO EAT**

**Figure 8-2.-Making rolls.**

2. Roll each piece of dough into a strip 1 1/2 inches in diameter.
3. Cut each strip into pieces weighing approximately 2 ounces each (fig. 8-2, view A).
4. Round each piece into a ball by rolling it with a circular motion on the workbench (fig. 8-2, view B).
5. When you have performed these basic steps you are ready to shape the dough into sandwich rolls, Parker House rolls, wiener rolls, or dinner rolls.

### **Hot Roll Mix**

Time-saving roll mixes have premeasured and combined ingredients except water and yeast. Follow

package and can instructions in mixing, fermentation, panning the dough, and bating.

### **Roll Production Precautions**

The following precautions are associated with roll production:

- Like bread production, temperature control is important. The AFRS temperatures should be used. Too high a temperature will cause dough to ferment too rapidly and rolls will be sour or yeasty tasting. Too low a temperature causes heavy, tough rolls.
- The amount of fermentation time needed depends on the amount of yeast and sugar used.
- The first major step in preparing hot rolls is the dough makeup. The variety of shapes possible with soft

and hard rolls is almost endless. Accurate scaling and skilled handling in forming shapes are required. Follow AFRS guidelines for hot roll makeup.

- Since rolls are smaller than bread, proofing time is very critical. Therefore, overproofed rolls will be blistered on the surface and will fall when placed in the oven. The texture will be coarse.

### Types of Rolls

Two variations of hot rolls—hard rolls and brown-and-serve rolls—can be made using the short-time formula. About 1 1/2 hours' preparation time per batch of hot rolls is saved if the short-time formula is used instead of the straight dough method. Also, a variety of sweet rolls can be made from the basic sweet dough recipe.

**BROWN-AND-SERVE ROLLS.**— For makeup, follow the procedure described for plain rolls for cutting and shaping. About 30 minutes (three-fourths proof) is needed for proofing. Bake at 300°F for 12 to 15 minutes or until lightly browned. Partially baked rolls may be refrigerated at 40°F up to 2 days. If freezer space is available, these rolls freeze satisfactorily up to 5 days. Finish baking at 425°F for about 12 minutes.

**HARD ROLLS.**— Hard rolls should have a crisp crust. Hard rolls must be thoroughly fermented or well aged because young dough produces tough, rubbery crusts. Bread flour is necessary for properly fermented or aged dough. Allow 1 1/2 hours before punching. Varieties of hard rolls include round, French, and caraway seed.

**SWEET ROLLS.**— A wide variety of sweet rolls can also be made from the simple basic sweet dough recipe. Sweet dough is prepared from a bread formula high in sugar, shortening, eggs, and other enriching ingredients. There are two types of sweet dough—regular sweet dough and Danish pastry. Products prepared from either of these doughs may be similar in size, shape, and weight but will differ considerably in texture. The fine, even grain and texture of regular sweet dough items are quite different from the flaky texture of the Danish pastry products. The dough should be smoother than bread dough, but it should not stick to your hands.

Among the types of sweet rolls that can be made from this basic recipe are cinnamon buns, butterfly rolls, doubleleaf rolls, pecan rolls, twists, chaintwists, braids, bear claws, crullers, snails, crescents, raisin buns, hot cross buns, plain coffee cake, small coffee cakes, and

Swedish tea rings (fig. 8-3). Specific instructions for making each of these types of sweet rolls from the basic dough recipe are given in the AFRS.

Much of the attractiveness of sweet rolls is due to the glazes and fillings used. You will find the recipes for these glazes and fillings in the AFRS—Frostings and Fillings, section D.

### Sweet Dough Mix

Some GMs purchase commercial sweet dough mix that is available through the supply system.

Sweet dough mix has premeasured and combined ingredients, except for water and yeast. Follow package or can instructions in mixing, fermentation, panning, and baking the dough.

### QUICK BREADS

Quick breads are bakery products in which quick-acting leavening agents such as baking powder and baking soda are used. Examples of quick breads are pancakes, muffins, and biscuits. These products require less time to mix and bake than yeast-raised products.

### Soft Batters

Soft batters contain varying amounts of liquid and may be prepared in either pour batters or drop batters. Pour batters are thin enough to pour directly from a container into cooking pans. An example of a pour batter is pancake batter. Drop batters are thick enough to require spooning into baking pans. An example of a drop batter is muffins.

### Roll-Out Doughs

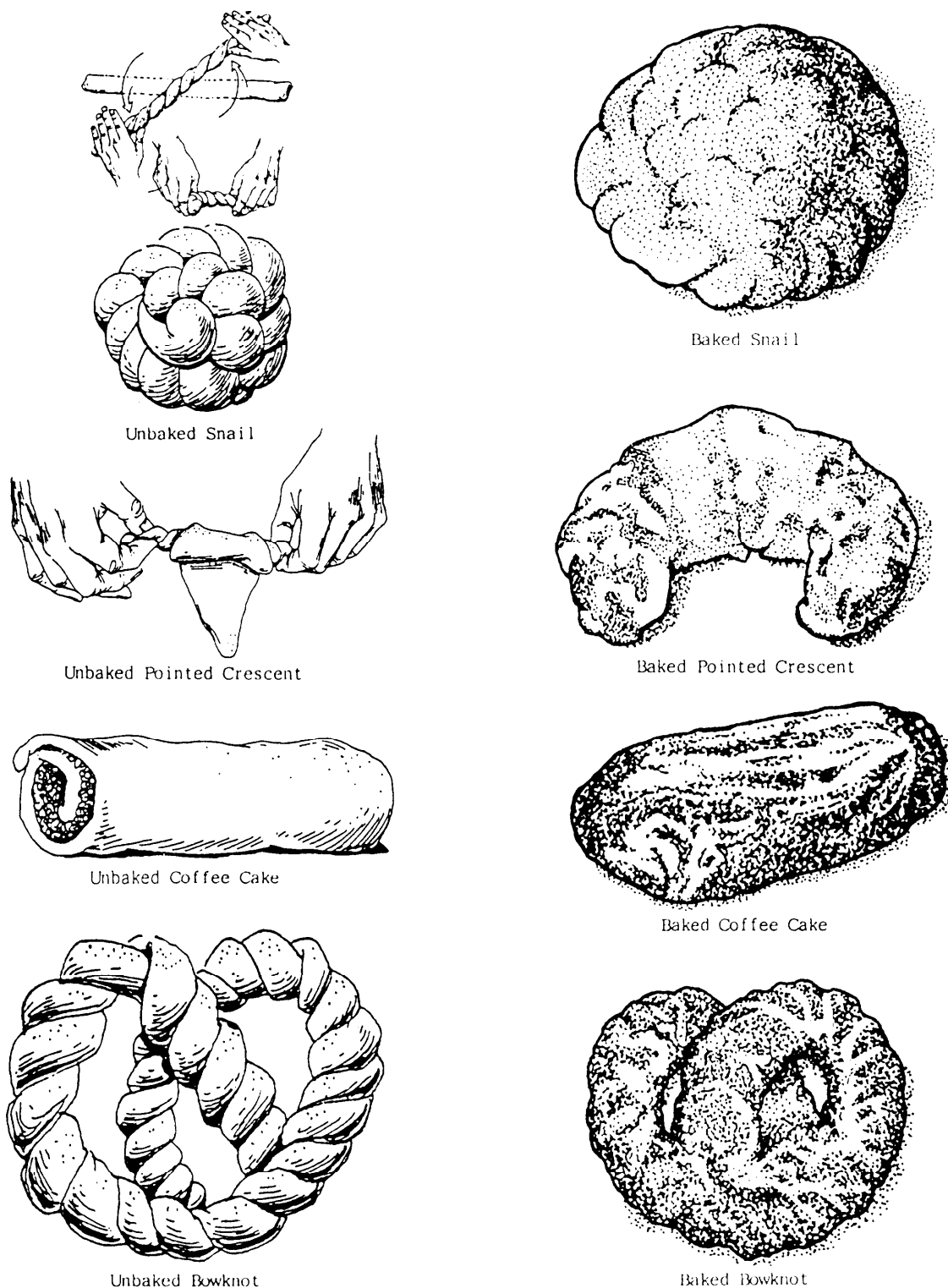
Roll-out doughs are soft dough products such as baking powder biscuits, or stiff dough products such as cake doughnuts.

### Dough or Batter Ingredients

Batters or doughs are made with dry mixtures of flour, baking powder, salt, liquids, and other ingredients such as fats, eggs, sugar, and flavoring.

**FLOUR.**— General-purpose flour is used for quick breads and batters. General-purpose flour produces finer grained baked products than bread flours.

**LIQUIDS.**— Nonfat dry milk is used in recipes for quick breads. The dry milk is sifted together with the other ingredients and the liquid is added later in mixing.



**Figure 8-3.-Sample of sweet dough variations.**

**LEAVENING.**— Baking powder is the chemical leavening agent used in AFRS quick breads. It is a double-acting baking powder in which one stage of leavening occurs in the batter and another occurs while the product is baking.

The amount of baking powder used depends on the type of bakery product, the ingredients, and their proportions. Baking powder must be measured accurately. Too much baking powder produces a coarse grain and may cause the product to fall after being taken

out of the oven. If excessive baking powder is used, the color will be dark and yellowish and the taste will be salty or bitter. Too little baking powder will result in the structure being heavy and dense with low volume.

**FAT.**— General-purpose shortening compound is used in quick bread and batter production. Shortenings produce products with a soft crumb and aid in browning.

**EGGS.**— An important ingredient in quick breads and batter is eggs, which add flavor, color, and palatability. They also provide some leavening action. Fresh whole eggs or frozen whole baking-type eggs are used. Dehydrated egg mix may be used as a successful substitute in any recipe if the eggs are sifted with the dry ingredients. This will assure even distribution and uniform reconstitution when the liquid is added.

**OTHER INGREDIENTS.**— Other ingredients include spices; grated, whole, or chopped fruits, nuts, poppy or caraway seeds; cereals such as bran or cornmeal; and salt. Salt adds flavor.

### Mixing Methods

How ingredients are mixed determines to a large extent the structure and texture of the finished product. All ingredients should be evenly mixed. If needed, the flour gluten should be developed to the desired degree to keep the loss of the leavening gas to a minimum during baking.

These general rules apply to mixing quick breads and batters, regardless of which mixing method is chosen:

- The degree of mixing is always limited when the leavening is produced by baking powder.
- The amount of mixing varies with the kind of ingredients and their proportion, except for leavening. For example, a product containing a high percentage of fat and sugar maybe mixed longer with less harm to the quality of the finished product.
- Recipes in the AFRS outline should be followed, step by step, as the method for mixing quick bread halters.

**MUFFIN-MIXING METHOD.**— This method is used for pancakes, muffins, corn bread, dumplings, and fritters. The sequence of steps for the muffin method includes sifting dry ingredients together, blending in the liquid and eggs, adding melted shortening, and mixing only until dry ingredients are moistened. Corn bread, muffin, and dumpling batters should appear lumpy.

**BISCUIT OR PASTRY METHOD.**— This means of combining ingredients is used principally for biscuits. This dough contains more flour than liquid and is of a kneaded consistency.

The dough is prepared by sifting dry ingredients together, blending in the shortening, adding the liquid, and mixing only enough to yield a uniform structure. The dough is then cut into the desired shapes and baked.

**CAKE METHOD.**— Several quick breads and batters are mixed by the cake method. Cake doughnuts, coffee cakes, and muffins are mixed similarly to batter cakes. Steps used in this method are as follows:

1. Cream shortening and sugar,
2. Add eggs.
3. Gradually add the dry ingredients to the moist ingredients, alternating so that you begin and end with the dry ingredients.

### Quick Bread Preparation

Both drop and pour soft batters and roll-out dough preparation methods are important to know. These batters and roll-out doughs are explained individually in the following sections.

#### Coffee Cakes

Coffee cakes are popular breakfast or brunch items. The recipe formulas are the same as for regular cakes eaten as desserts, except for minor ingredient changes. The major difference is in the frosting used on cakes.

Coffee cakes are either topped with sweetened crumbs or combined with fruit. Crumb cake and quick coffee cake recipes in the AFRS are of this type. Serve these cakes while still warm. Quick coffee cakes may be prepared with biscuit mix. Check the AFRS for variations.

#### Corn Bread

Corn bread is a quick bread popular in both northern and southern parts of the United States. Yankee-style corn bread is prepared with sugar; southern style is prepared without sugar. Jalapeno corn bread may be prepared by adding chopped jalapeno peppers.

Corn bread can be baked in either sheet pans (18 by 26 inches) or the batter may be poured into muffin pans to make muffins. Corn bread mix is available. See the AFRS recipe card for directions.

## **Hush Puppies**

Hush puppies are small balls of corn bread batter (about 2 tablespoons) that are deep-fat fried. Finely chopped onions and black or white pepper are added to the corn bread batter. The sugar is eliminated. Corn bread mix, a complete mix except for water, is available for preparing corn bread, muffins, and hush puppies. Check the AFRS for directions.

## **Dumplings**

There are two basic types of dumplings included in the AFRS. The first type is the meat dumpling that accompanies meat stew or poultry and is made from a dough that contains eggs and has no fat. This dumpling is light in texture and bland in flavor to accompany any meat or poultry entrée without overpowering it. This type is cooked by steam or in boiling stock. These dumplings are dropped by scoop or 1/4-cup measure on top of simmering stew. The kettle should be covered during the entire cooking period to assure fast and even doneness.

A finished dumpling should not be gummy. Dumpling quality should be the same when cooked in stock in kettles, stockpots, insert pans, or steamers. The outside of the dumpling is characteristically moist, and the inside is light and fluffy. Dumplings absorb the flavor of the accompanying meat dish.

The other type of dumpling is a filled baked dessert and is explained later in this chapter.

## **Fritters**

A fritter is a food, such as fruit, meat, poultry, or vegetables, that has been dipped in a milk-egg-flour batter and fried in deep fat. The food maybe uncooked, cooked, or a leftover. Fritters are made by combining a vegetable, such as corn, into the basic batter. The AFRS contains recipes for apple fritters and corn fritters.

The muffin method is used for mixing fritters; that is, dry ingredients are sifted together, liquid ingredients are combined and added with melted shortening. The amount of mixing is not as critical in the production of fritter or batter mixtures as it is with other quick breads because of the high ratio of liquid to flour and the volubility of the other ingredients. There is less tendency to overdevelop the flour gluten because the ingredients mix easily. Fritters are usually very tender products because they are cooked in deep fat.

Fritters should be thoroughly drained after drying. Place the fritters on absorbent paper for a short period. Fry in small batches because fritters lose crispness if allowed to stand on a steam table.

Commercial breading and batter fry mix is a product made of ingredients similar to those used in fritter batter. Fry mix may be used for deep-fat frying, panfrying, or for grilling. Pancake mix batter may also be used for making fritters.

## **Tempura Batter**

Tempura batter is prepared from flour, baking powder, salt, ice-cold water, and beaten eggs. The batter is unsweetened and lighter than fritter batter. It is used for dipping raw shrimp, onion rings, or a variety of other vegetables before frying. Check the AFRS for directions.

## **Pancakes**

The muffin method is used in mixing pancakes. Mixing should be kept to a minimum to prevent the overdevelopment of the flour gluten, which causes a tough texture.

Cooking should begin as soon as the ingredients have been mixed. A hot, lightly greased griddle is essential in producing high-quality pancakes. The griddle should be maintained at 375°F. Too high or low a temperature causes uneven browning and heavy textured pancakes.

## **Muffins**

Ingredients for muffins cover a wide range of products including fruits, nuts, bacon, and cereals in addition to the plain muffin ingredients.

Muffins are mixed using the muffin method. The mixing time is more limited for muffins than for other products mixed by this method because of the high ratio of flour to liquid. After the addition of eggs, shortening, and water, the muffin mixture should be stirred until dry ingredients are slightly moistened. It is essential that dry flour lumps be dampened. After mixing, the batter should appear quite lumpy. If overmixed, tunnels and peaks form, the product texture is tough, and the volume is low. Drained blueberries, chopped nuts, dates, or raisins are folded into the batter just before panning.

The panning procedure is an extremely important aspect in muffin preparation. The muffin pans should be well greased. Gas that causes the muffin to rise can

escape rapidly if the mixed batter is allowed to stand. Scale each muffin carefully, filling each muffin cup two-thirds full. Too much batter in muffin pans causes muffins to be coarse. A well-prepared muffin has a uniform texture, even grain, and a well-rounded but uniform top crust. A muffin mix is available. Prepare it according to instructions on the container.

### **Baking Powder Biscuits**

Baking powder biscuits are prepared from flour, liquid, shortening, salt, and a leavening agent. When mixing, the shortening should be cut in thoroughly until the mixture resembles cornmeal.

The proportion of liquid to dry ingredients is extremely important in the production of biscuit dough. The dough should be soft, not dry or stiff, and slightly sticky. Gradually add water until dough is formed. The condition of the flour, moisture in the bake shop, and the speed of mixing can alter the amount of liquid used. When to stop adding liquid will be recognized as experience is gained in the production of biscuits.

**BISCUIT MIX.**— Biscuit mix is also used and contains all the ingredients except water. The leavening agent is packaged separately from the other ingredients. It should be thoroughly blended with the mix before blending in the required water. Follow directions for baking listed on the container.

**BISCUIT VARIATIONS.**— Biscuit variations may be prepared by rolling the dough in a rectangular shape, spreading the dough with butter, and adding brown sugar and nuts or a granulated sugar-cinnamon-raisin filling. The biscuit dough is rolled up like a jelly roll and the biscuits are then sliced. Cheddar or American cheese that has been grated maybe added to the dry ingredients to make cheese biscuits.

### **Cutting and Panning**

Biscuit cutters used are 2 1/2 inches in diameter. Dip cutters in flour and tap lightly to remove the excess flour before cutting out the biscuits. Cut the biscuits so that rounds do not overlap.

Biscuit dough also may be patted on baking sheets and cut with a sharp knife in squares to speed up production and to save rerolling of dough. If little space is left between each biscuit on the pan, less crust is formed. If more crust is wanted, place biscuits farther apart. Baking powder biscuits should be baked at the temperature listed in the AFRS. They are best when served piping hot.

## **YEAST-RAISED DOUGHNUTS**

The doughnut formula is basically a sweet dough; however, leavening and eggs are decreased and a combination of bread and general-purpose flours is used. A blend of general-purpose and bread flours produces a more tender texture and a shorter fermentation time than if all bread flour is used.

Doughnut formulas contain different percentages of sugar, shortening, and eggs; the greater amount used, the richer the dough. However, variations in richness for yeast-raised doughnuts do not extend over as wide a possible range as with cake doughnut formulas that tolerate larger quantities of sugar and eggs.

The sugar content in yeast-raised doughnuts controls, to some extent, the amount of browning and fat absorption during frying.

The quality of ingredients is just as important in doughnut production as it is in other yeast-raised items. Extreme care in mixing, fermentation, and makeup is essential to high-quality doughnut production.

### **Mixing**

Mixing temperature should be controlled so that the dough leaves the mixer at 78°F to 82°F. The temperature of ingredients when mixed has a definite effect on the amount of fat absorbed during frying. Mixing time should be limited to 10 minutes or until the dough is smooth and elastic.

### **Fermentation and Makeup**

Mixed doughs should be immediately divided into uniform pieces, the size of which depends on the weight of the entire batch being made up. Follow recipe instructions for rolling and cutting, as thickness of dough and uniformity of doughnut size are extremely important to proper frying. If there are cracks in the dough, or if it is stretched unnecessarily, the dough will tend to absorb a greater amount of fat during frying.

**CUTTING.**— Doughnut cutters should be used carefully to prevent overlapping the cuts and wasting the dough. Reworked and rerolled dough can be used, but will not give cut doughnuts a smooth surface or an even brown color.

Doughnuts may be cut into various shapes. Other than the characteristic round shape without centers, there are long johns, crullers, and beignets.

Yeast-raised doughnuts are neither dispensed from a machine into frying fat nor mechanically cut because they require a short proofing period.

**FRYING.**— Recommended temperature of the fat is 375°F for raised doughnuts. Make certain the correct temperature is used because doughnuts will soak up fat that is too cool and will brown before they are done if fat is too hot. To allow for expansion of dough and turning room, place cut doughnuts carefully in fry baskets one-half inch apart and lower into hot fat.

Normal fat absorption should be 2 to 3 ounces per dozen. This absorption is both desirable and necessary to create high-quality products. Grease soaking is undesirable, however, and is caused principally by undermining of dough, misshapen cuts and rough surfaces, and poor-quality fat used in the frying process. A fat-soaked doughnut is heavy, greasy tasting, and stales very rapidly.

Doughnuts removed from the fat should be thoroughly drained on racks or absorbent paper and cooled to 160°F if glazed. If topped with coatings, doughnuts should be cooled to 72°F (room temperature).

## **FILLINGS AND FINISHES**

Fillings made from fruits such as cherries, pineapple, and prunes, almond paste, cream fillings, or sugar and spice mixtures may be used to fill coffee cakes, sweet dough, and Danish pastry. Most everyone prefers a coating or finish of one type or another on sweet rolls, coffee cakes, doughnuts, and other pastries. An endless combination of ingredients can be used for this purpose. The following are the most commonly used combinations:

- Dry coatings such as cinnamon-sugar filling, powdered sugar, or granulated sugar
- Glazes such as vanilla or butterscotch for doughnuts and syrup or syrup-fruit glazes for sweet rolls and coffee cakes
- Washes for breads, rolls, and coffee cakes
- Toppings

### **Dry Coatings**

The dry coatings are used most often on cake doughnuts. Using dry sugar coatings is somewhat more complicated than merely shaking together a properly cooled fried cake doughnut and sugar in a paper bag.

Sugar coating will shed off rapidly from an overcooked, dry doughnut. On the other hand, a sugared doughnut appearing moist on the surface may be an undercooked doughnut. If the sugar melts or disappears, the doughnut is too moist. This condition is known in the baking industry as sweating. Follow the AFRS for preparing cake doughnuts. Cake doughnuts should be cooled before being sugared.

### **Glazes**

A vanilla glaze is usually applied to yeast-raised doughnuts, but cake doughnuts also may be glazed. Other glazes incorporating imitation maple, rum, brandy, cherry, almond, and black walnut flavoring may be used.

Doughnut glazing is somewhat more complicated than the sugaring process because the glaze is much less stable, particularly at warm temperatures. Glazes should be sufficiently thin to flow and to allow the excess to roll off.

Yeast doughnuts should not be less than 160°F when glaze is applied. Taken from 375°F deep fat, a doughnut will cool to the proper temperature in about 1 to 2 minutes. Doughnuts should be submerged into the glaze and drained on a wire screen until the glaze is set. Air circulation around the entire doughnut is important in setting the glaze.

Syrup glazes are usually applied to rolls or coffee cakes. A syrup glaze is prepared from a mixture of blended syrup and water that is boiled for 5 minutes. For variation, a fruit juice or pureed fruit, sugar, and syrup mixture can be prepared. Brush syrup glazes over hot baked coffee cakes and sweet rolls.

### **Washes**

Washes are applied to sweet doughs before baking and are used in addition to glazes or toppings in many products. They are used also on pastry, some quick breads, yeast bread (rolls and buns), and bar cookies.

Washes serve two functions: (1) to wash off excess flour and facilitate browning and (2) to provide a surface to help added toppings such as nuts, fruits, poppy or sesame seeds, or onions stick to the products. Any one of the following ingredients maybe used individual y or in combination: butter, cornstarch, whole eggs, and egg whites.

## **Toppings**

Toppings such as glazed nut, orange coconut, raisin, streusel, pecan, or praline toppings are added to sweet rolls or coffee cakes before baking.

## **PIZZA**

Almost any lean dough formula, such as that for French bread, can be used for making pizza. The major difference between a particular formula for pizza and lean bread doughs is that the yeast is not fed. That is, sugar is not an ingredient in a pizza formula because it is not needed to supply the yeast energy. Volume is not a factor in pizza doughs. Fermentation for pizza is relatively short in comparison with other bread doughs and makeup consists only of flattening the dough to the required dimensions.

Partially baked pizza crusts are prepared commercially and frozen. Add galley-prepared pizza sauce and bake according to package directions.

## **DESSERTS**

Desserts are popular in the GM. A dessert maybe as simple as a fruit gelatin or as elaborate as a decorated cake. The AFRS has a wide variety of recipes for all types of desserts. The AFRS also has step-by-step procedures for the preparation and service of desserts, but the end result is often determined by the dedication and experience of the Mess Management Specialist (MS) that prepares the dessert.

## **CAKES**

Cakes are popular desserts in the GM. A wide variety of colors from a few basic recipes are possible through the use of varied shapes, frostings, or fillings. Cakes are easily made in large quantities and they are less perishable than many other types of desserts. Service in the GM is greatly facilitated by the use of cakes for dessert because they can be made up ahead of time.

### **Types**

Cakes can be divided into three separate types according to the ingredients and the proportions of the ingredients used in each. The three types are batter cakes, foam cakes, and chiffon cakes.

**BATTER CAKES.**— Batter cakes contain shortening. They include the pound cakes (loaf type)

containing a high percentage of fat, the plain cakes (basic type of layer) containing smaller percentages of fat, and the chocolate cakes (incorporating cocoa and soda) such as devil's food and mild chocolate cakes.

**FOAM CAKES.**— Two kinds of foam cakes served in the GM are angel food and sponge cakes. Angel food cakes are foam cakes that are leavened by air beaten into the egg white. Cream of tartar is added to the egg whites to make them firmer when they are beaten.

Sponge cakes are foam cakes containing baking powder and whole eggs. The eggs are combined with the sugar and heated until the mixture is lukewarm (110°F), and then the mixture is beaten.

**CHIFFON CAKES.**— Chiffon cakes contain both foam and batter, mixed separately and folded to a mixture.

The subdivisions of the three types are many and dependent upon the method of incorporating the ingredients and upon the variation of ingredients added to the basic recipe. Batter and sponge-type cakes are the ones normally prepared in Navy dining facilities; consequently, further discussion will relate only to these.

### **Functions of Cake Ingredients**

Each ingredient in a basic recipe has a specific function.

Flour furnishes structure and is used to hold the other materials together in making a cake. It should be a general-purpose flour.

Sugars, used chiefly as sweeteners, have a tenderizing effect resulting from their ability to soften flour protein and starches. By lowering the caramelization point of the batter, sugars allow the cake crust to color at a lower temperature. Sugars also help to retain moisture in the baked cake, thereby keeping the cake moist and edible for several days.

Shortening carries the air that is incorporated in the finished cake batter. This air has a tenderizing action on the cake by virtue of its leavening action. Thus, shortening is considered to be a tenderizing agent.

Eggs furnish structure, moisture, flavor, and color. Egg whites for whipping must be free from grease or traces of egg yoke—as little as one-tenth of 1 percent will adversely affect the whipping quality.

Milk, water, fruit juice, or coffee can be used as the liquid in cake. Liquid is needed to combine and actuate

all other ingredients. It controls the consistency of the finished cake batter.

Salt brings out the flavor of the other ingredients.

Leavening is accomplished in three ways: (1) incorporation of air during mixing, (2) chemical leavening, and (3) vaporization of the liquids in the dough by the heat of the oven.

### **Cake Mixes**

Cake mixes are convenient to use as they require shorter preparation time, less storage space, no refrigeration, and less training and experience to prepare successfully than cakes made from recipes using the basic ingredients. Cake mixes are available in a variety of flavors and preparation instructions are printed on the containers. Cake mixes are complete mixes that require only the addition of water. They contain a leavening agent, bicarbonate of soda (baking soda), packed separately inside the container. The soda packet should be mixed thoroughly with the dry ingredients before adding water. Cheesecake mix is combined with milk before mixing. No baking is required. Recipes for variation to cake mixes are given in the AFRS.

### **Cake Making**

In addition to the proper selection of ingredients, accurate measuring, and proper mixing, other factors influence the finished product.

**CAKE PANS.**— Cake pans should be handled carefully so they do not warp or bend. You should not use pans that are bent out of shape because cakes will be uneven in shape and color. Cake pans may be greased or greased and dusted with flour, or they may be lined with wax or kraft paper. Some recipes call for a pan coating made from shortening and flour mixed together. Pans for angel food cake should not be greased because the fat will keep the cake from rising. Each AFRS cake recipe specifies which method is used.

**PAN CLEANING.**— If grease is allowed to build up in pans, especially in corners, it can become rancid and give a very objectionable taste. Care should be taken to clean baking pans thoroughly each time they are used.

**SCALING.**— Scaling too much batter or using the wrong size pan can cause the cake to fail. Follow the instructions given on the specific recipe card. The AFRS cake recipes are designed to yield the correct amount of batter for standard 18- by 26-inch sheet cake pans. Use only lightweight sheet pans. If heavier sheet

pans are used, they will cause overdone products. Other pan sizes may be used such as 9-inch layer pans or 16-inch square sheet pans. A listing of pans and sizes is found on the AFRS guideline cards.

**OVEN TEMPERATURES.**— Set the oven at the temperature specified in the recipe or in the cake mix directions and allow enough time for it to reach the correct temperature so that the cake can be placed in the oven at the specified baking temperature as soon as it is mixed. The oven thermostat should be checked from time to time to make sure it is working properly.

Allow space in the oven between the pans so that heat can circulate. Cake pans should be placed so that they do not touch each other or the sides of the oven.

If the oven is too hot, the cake will have a peaked, cracked surface and will be too brown. It will also be dry and shrink excessively. If the cake is baked too rapidly, the outer edges will be done while the center will be uncooked and the cake will fall when it is removed from the oven. If the temperature is too low, the cake will not rise well. The AFRS guideline cards give the cause of cake defects and failures.

**BAKING.**— During baking, the proteins in the flour and eggs coagulate and the starch in the flour swells and absorbs moisture, causing the cake to become firm. Baking takes place in four stages. In the first stage, the batter is fluid and rises rapidly as the leavening develops. In the second stage, the batter continues to rise and the cake becomes higher in the center than at the edges. Bubbles rise to the top, the surface begins to brown, and the batter begins to become firm on the edges. In the third stage, the cake has completed rising and it becomes firmer and browner. In the fourth stage, browning is completed and the structure is set. When you are baking in a conventional oven, do not open the oven door until baking time is almost ended or the cake may fall.

**USING CONVECTION OVENS.**— Baking times are shorter and cooking temperatures lower in convection ovens than in conventional ovens. The AFRS guideline cards list specific times and temperatures. Overloading convection ovens will cause cakes to bake unevenly. When operating a convection oven, you should turn off the fan when loading and unloading. To load cakes into convection ovens, you should start with the bottom rack and center the pans, taking care not to touch the heating elements. Leave 1 to 2 inches between pans so air can circulate. After you load the cakes, allow them to bake for 7 to 10 minutes

before turning on the blower. Or, if the fan has two speeds, use the lower speed.

Check the cakes in about one-half the cooking time specified in the convection oven owner's manual. If the cakes are baking too quickly (cooked around the edges, but not done in the middle), reduce the heat 15°F to 25°F and use this lower temperature for each successive load. The oven vent should be open when baking cakes. If the vent is closed, the moisture in the oven will keep the cakes from rising. A fully loaded convection oven will bake cakes more slowly than a partially loaded oven.

**TESTING FOR DONENESS.**— To determine if the cake is done, touch the center of the cake lightly. If an impression remains, return the cake to the oven for 3 to 5 minutes more and then retest. A toothpick or wire cake tester may be inserted into the cake. If no batter clings when it is removed, the cake is done. Batter cakes will shrink slightly from the sides of the pans when done.

**COOLING.**— If space is limited, cakes may be cooled, frosted, and served in the baking pan. If the cake is to be removed from the pan for icing, decorating, and service, allow it to cool for about 15 minutes or as directed in the specific recipe. Remove jelly rolls from pans while they are hot. Paper liners should be removed while the cake is still hot. If allowed to cool, the paper will cause the cake to pull apart and tear. Generally, however, for most cake items use a spatula to gently loosen the cake around the sides of the pan. Cover the cake with the bottom side of a clean pan of the same size and invert both pans. The cake should drop easily onto the clean pan. Cakes baked in loaf pans should be cooled completely in an upright position before they are removed. Cut around the sides, tilt the pan, and slide the cake out gently.

**CAKE CUTTING.**— To prevent breaking, cakes should be completely cooled before icing and cutting. Cakes baked in standard-size sheet pans are usually cut into 54 square pieces, 6 across and 9 down.

For other cake shapes consult the AFRS guideline cards. To cut a cake use a knife with a sharp, straight edge and a thin blade. Dip the knife in hot water before cutting and repeat as necessary to keep crumbs and frosting from clinging to the knife. Cut with a light, even motion. A loaf cake or fruitcake should be cut with a slow sawing motion. Fruitcakes cut easier if they are chilled first.

**STORING CAKES.**— Cover cakes with moistureproof paper and place them in a clean area with a temperature range of 75°F to 95°F where they will not

absorb odors. Cakes should be served within 1 to 2 days for best quality.

## CAKE DECORATING

Cake decorating does not have to be limited to holidays and special events, such as a change of command or a retirement. Some commands honor the birthdays of crew members weekly with a decorated cake. This gives the MSs frequent opportunities to practice and develop their skills at cake decorating.

The first important step in cake decorating is to have a frosting of the type and consistency required to make the desired shapes. Decorators' frosting and cream frostings are suitable. Frostings used for decorating should be stiffer than those used for spreading.

### Decorating Equipment

The second important step in cake decorating is to have the equipment needed: cones, tips, tubes, and coloring.

**CONES.**— The cones used for cake decorating may be either pastry bags purchased to fit commercial tubes, or they maybe made from paper. Paper cones are easily made, are disposable, and are sanitary. The best paper used to make a cone is parchment paper. Heavy waxed paper also can be used, although it is less rigid and, therefore, more difficult to handle. Several cones can be filled with different frosting colors to be used alternatively in decoration.

**TUBES.**— There are many kinds and sizes of metal tubes (tips) available. They can be selected from those in standard stock or purchased to fit individual requirements. By varying the colors of the frosting and the sizes of the metal tips, a wide variety of decorations can be made. Borders can be plain or elaborate, depending on the tube used. Writing should be carefully planned before starting so it will be well centered.

An open star metal tip is used to make shell, rope, and heavier ridged borders or small flowers. Examples of various tips and the designs they make are shown in the NAVSUP P-421.

**FOOD COLORINGS.**— Food colorings are available in paste and liquid forms. A little coloring goes a long way. Food coloring paste will give dark shades when desired, but will not thin the frosting. Liquid colorings will thin icings and will provide only pastel shades.

To color frosting, first blend the coloring into a small amount of frosting. Then add this blend gradually to the rest of the frosting until the desired shade is obtained. Use paste shades. Dark colors, such as bright red, blue, and green, should be used only for accents and for holiday cakes.

Secondary colors may be obtained by blending primary colors:

- Blue and yellow make green.
- Yellow and red make orange.
- Red and blue make violet.

By shading violet with blue, purple is obtained; violet with red yields a reddish violet. By using red or orange, you can make red or yellow-orange by shading orange with either red or yellow. Blue-green will result when green is shaded with yellow or blue.

Try to keep icing colors as close to nature as possible by leaning toward pastels. If you must use bright colors, use them sparingly, as accents mostly, and for children's and holiday cakes. Concentrated paste colors are best to use. They give you dark shades when you want them and will not thin icings as liquids sometimes do.

### Decorating Techniques

The NAVSUP P-421 extensively describes decorating techniques, examples of various decorator designs, and includes exercises devised to give you practice.

### Frostings

Frostings add to the appearance and flavor of cakes and help to keep them moist. Some cakes, such as pound cake and fruitcake, are generally served without frosting, but most cakes require some kind of frosting or glaze. Jelly rolls are filled with jelly or cream filling, and powdered sugar is sprinkled on top.

**FROSTING INGREDIENTS.**— Ingredients used to prepare frostings include liquids, sugar, fat, flavoring, and salt.

**Liquids.**— Liquids make the frostings soft enough to spread. Milk water, coffee, and various fruit juices are the liquids specified in frosting recipes.

**Sugar.**— The kinds of sugar used to make frostings are granulated, brown, powdered (confectioner's), and blended syrup (corn and refiner's). Powdered sugar is preferable in uncooked frosting because it is fine grained

and dissolves rapidly. Blended syrup prevents the formation of large crystals that cause graininess in cooked frostings. If too much syrup is used, it will keep cooked frostings from hardening.

**Fat.**— Butter is the fat ingredient usually specified in the AFRS frostings.

**Flavoring.**— The AFRS frosting recipes specify vanilla flavoring, but other kinds of flavoring may be substituted where they would be appropriate for the flavor of the cake. Some of the flavorings available are imitation almond, banana, brandy, black walnut, cherry, lemon, maple, orange, peppermint, pineapple, and rum.

**Salt.**— Salt is an important ingredient in frostings because it brings out the other flavors.

**UNCOOKED FROSTINGS.**— Uncooked frostings are easy and quick to prepare. All ingredients should be blended at room temperature. Powdered sugar is the major ingredient in cream frostings; other basic ingredients are softened butter and liquid. The secret of a good uncooked frosting is thorough creaming until the product is light and fluffy. If frosting is too thick, add a little liquid. If too thin, add additional powdered sugar until the desired consistency is obtained. More flavoring may be required to prevent a flat sugar taste.

Decorator's frosting, a very hard uncooked frosting, is used to make decorative or special occasion cakes. It is suitable for making designs, flowers, latticework, or other forms. The decorations can be set on waxed paper to dry and then removed and placed on the cake. Because this type of frosting dries rapidly, unused portions should be covered. Royal frosting is better to use for decorating than other frostings that are softer and might run or weep.

**COOKED FROSTINGS.**— Temperature is very important in cooked frostings. Follow the directions given for cooked frostings in the AFRS. For best results, cakes with cooked frostings should be used on the same day they are prepared.

**CAKE FROSTING PROCEDURES.**— Cakes should be completely cooled, but not chilled before frosting. This prevents the cake from breaking when frosting is spread over it. Remove loose crumbs. The consistence y of the frosting should be such that it spreads easily, but is not so thin that it runs off. The cake should be frosted far enough ahead of time (an hour or more) to allow the frosting to set before it is served.

To frost a cake, space six equal portions of frosting evenly over the center of the cake. Using a spatula,

spread the frosting to the same thickness across the top and to the edges of the cake. The AFRS has guidelines for preparing frosting and for frosting all types of cakes.

**TOPPINGS, GLAZES, AND FILLINGS.—** Toppings, glazes, and fillings, or a combination of these, can enhance the flavor, texture, and appearance of cakes. Some cakes are identified by the toppings or glazes. Pineapple, or other fruit, combined with brown sugar and melted butter and covered with yellow cake batter makes upside-down cakes. Shortcake are made by serving fruit and whipped topping with plain cake. Gingerbread is usually served with whipped topping or lemon sauce. Boston cream pie is a cake with a cream filling and covered with chocolate glaze. To make jelly rolls, sponge cake is spread with jelly, rolled, and cut in slices. Vanilla glaze topping may be spread over angel food cakes or drizzled over bundt-type cakes such as chocolate macaroon cake. Ice-cream toppings and powdered sugar may be served with pound cakes for variation.

## COOKIES

Cookies are a popular dessert. Unlike most other desserts they can be stored for a day or more and used as they are needed. The various types of cookies are defined by the special processes used in making them. These types and processes are described in the following paragraphs. General directions for successful cookie making are summarized.

### Types of Cookies

Cookies are often referred to as small sweet cakes and classified by the method of mixing: stiff dough, soft dough, and refrigerated dough. Recipes for the three classes of cookies are contained in the AFRS. The following types of dough are used in the production of cookies: soft dough is used for drop cookies; stiff dough is formed into a roll and baked on sheet pans; and refrigerated dough is formed into a roll, wrapped, and refrigerated until sliced and baked.

Cookies are formulated much like cake, except that there is less liquid (eggs and milk) and the baked cookies are characterized by soft, hard, brittle, or chewy textures.

**SOFT DOUGH.—** Soft-batter cookies have a high moisture content and, therefore, require a greater percentage of eggs to give them structure. The desired finished product is soft and moist and should be stored or packaged in a container with a tight-fitting cover.

Cookies included in this category are dropped cookies of all sorts and brownies (butterscotch and chocolate).

**STIFF DOUGH.—** Formulas of stiff dough contain less liquid and eggs and more flour than soft cookies. These cookies are often referred to as sliced or rolled cookies. The desirable finished product is crisp. When humidity becomes excessive, the cookies become moist and tend to soften up and lose their desirable crispness. Examples are peanut butter cookies and sugar cookies. Crisp cookies should be stored in a container with a loose-fitting cover.

**REFRIGERATOR DOUGH.—** Refrigerator cookies are mixed in the same manner as other cookies, except the dough is very stiff. The resulting cookie is very brittle. After the mixing is completed, the dough is weighed into pieces of convenient size. The dough is then formed into rolls, then they are sliced into the desired slices, wrapped in wax paper, and put into the refrigerator until time to bake them. The advantage of this type of cookie is that it can be made and stored in the refrigerator until it is needed, thus eliminating waste and providing a ready source of dessert at short notice. Butternut and chocolate refrigerator cookies are good examples.

### Mixing Methods

Cookies are mixed in much the same manner as batter cakes. The temperature of the ingredients should be approximately 70°F. The dough is sometimes chilled later to facilitate shaping.

Cookie doughs should be mixed just enough to blend the ingredients thoroughly. Overmixing develops the gluten in the dough, thereby retarding the spread. When the mix is overcreamed, the cookies will not spread as much because of the dissolving of the sugar crystals. Improper mixing of ingredients will produce cookies that are spotted.

The conventional or creaming method is the most commonly used method. The longer the shortening and sugar are creamed, the less spread the final product will have because the sugar will be more finely distributed throughout the mix. The longer the dough is mixed after blending the flour and water, the more developed the structure of the mix will become and less spread will result. Undercreaming will give the cookies a coarse structure and will result in a baked product that has too much spread. If lumps of sugar are left in the dough during mixing, sticking is likely to occur due to the syrup that is formed during baking. Then, the sugar becomes hard and solidifies on the pans.

## Cookie Mix

For convenience in preparation, oatmeal cookie mix is authorized throughout the Navy. The mix is packaged in No. 10 cans. One can (5 pounds) of mix yields 100 cookies. Preparation is simple. The mix is combined with water and the dough may be dropped, rolled, or sliced. A variety of cookies can be prepared from the basic mix. Instructions for raisin, date, nut, chocolate chip, and applesauce variations are printed on the container.

## PIES

A successful pie should have a tender crust. To make sure the piecrust is tender the proper ingredients must be used and the dough should be carefully mixed.

If properly made, the standard piecrust has outstanding characteristics. In appearance, it will be golden brown with a rough surface that appears blistered. The texture will be flaky or mealy depending upon the method used to combine the ingredients. It should be tender enough to cut easily, but not so tender that it breaks or crumbles. The flavor should be delicate and pleasing.

### Piecrust Ingredients

Piecrusts are made from flour, shortening, water, and salt.

**FLOUR.**— General-purpose flour should be used to make piecrust as it produces pie dough that is easy to handle and pan. Do not use bread flour. It will cause tough pastry.

**SHORTENING.**— General-purpose shortening compound should be used as it makes the crust flaky and tender. Rancid shortening or shortening that has absorbed other odors causes off-flavors in piecrust and should never be used. The shortening should be approximately 60°F when ready for mixing and just soft enough to blend with the other ingredients. At 60°F, the shortening blends well into the flour while giving firmness so that a flaky piecrust is produced. Bakery emulsifier shortening, melted shortening, or salad oil should not be used as they will cause the dough to be oily and hard to handle and will not produce flaky piecrusts.

**WATER.**— The quantity of water and the method of mixing it with the other ingredients are the most important factors in making a tender piecrust. The water should be cold (40°F to 50°F). The amount of water

should be sufficient to make a dough that forms a ball that does not crumble, but also is not sticky when rolled out. Too much water will cause toughness.

**SALT.**— Salt aids in binding the ingredients together and enhances the flavors of the other ingredients.

### Mixing

The flour and shortening should be mixed together until they form very small particles and are granular in appearance. When mixing by hand, the water should be added gradually until the dough reaches the right consistency—neither sticky nor crumbly. When you are machine mixing, the water is added all at once and mixed just until the dough is made.

### Rolling the Dough

Divide the mixed dough into three sections (about 5 pounds 3 ounces each) and chill for at least 1 hour. The chilled dough will be easier to handle. When you are rolling the dough, handle it as little as possible. The pastry board or workbench and rolling pin should be dusted lightly with flour to prevent the dough from sticking. Using a dough divider, cut the dough sections into 7-ounce pieces for top crusts and 7 1/2-ounce pieces for bottom crusts when making two-crust pies. For one-crust pies, 7 1/2-ounce pieces should be used.

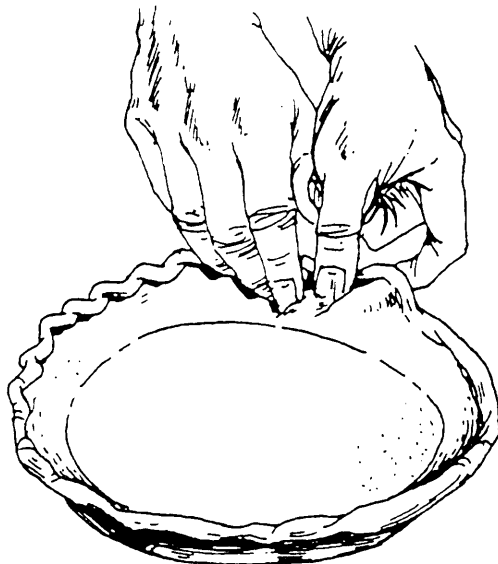
Lightly dust each piece of dough with flour and flatten the pieces gently with the palm of the hand before rolling. Use quick strokes and roll from the center toward the edge to form a circle about 1 inch larger than the pan and about one-eighth inch thick. If the dough is stretched or forced, it will shrink back during baking. Pie dough pieces may be placed into a pie rolling machine, if available. The pie dough will be rolled out automatically into a circular shape and ready for panning. Do not grease pie pans. The dough has enough shortening to keep the crust from sticking.

Fold the circle of dough in half and place it in the pan, then unfold it to fit smoothly in the pan. Make sure to fit the dough carefully into the pan so that it is flat and air pockets cannot form between the pan and dough.

### Types of Pies

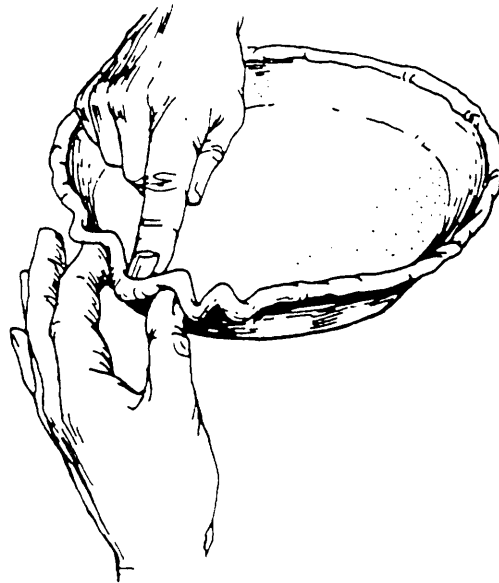
The types of pies prepared in the GM are one-crust (custard type), one-crust (prebaked shell), and double-crust pies.

**ONE-CRUST PIE (CUSTARD TYPE).—** After you roll out the dough and place it in the pan, make an edging by forming a high-standing rim on the pie shell and fluting (fig. 8-4). Fill the pie with filling and bake according to the recipes.

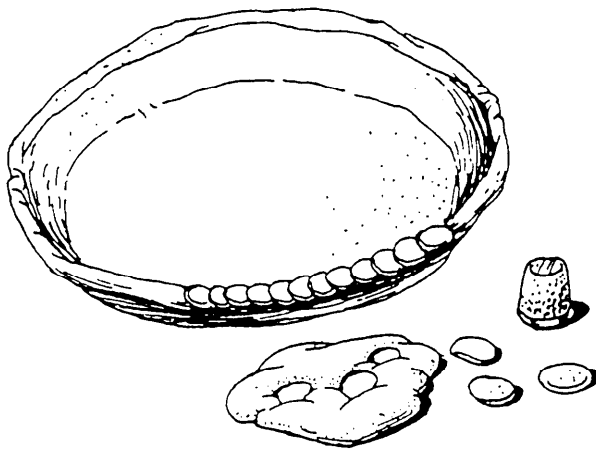


**Fluted:** Form a high-standing rim. Place right index finger inside rim; make flutes every 1/2-inch by pushing pastry into V with left thumb and index finger outside rim. Pinch flutes for clean edges.

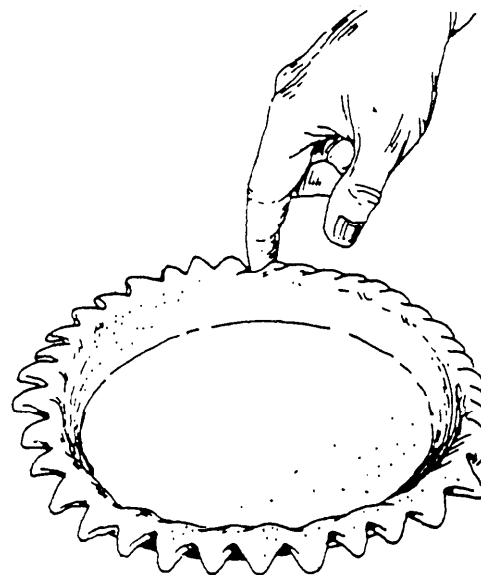
**ONE-CRUST PIES (PREBAKED SHELL).—** After placing the dough in the pan and fluting the edges, the dough should be pricked with a fork or docked. This enables air or steam that is formed underneath the crust during baking to escape without causing the crust to puff



**Scalloped:** Form a standing rim. Place left thumb and index finger 3/4-inch apart on outside of rim. With right index finger, pull pastry to center to form scallop. (For one-crust pies only.)

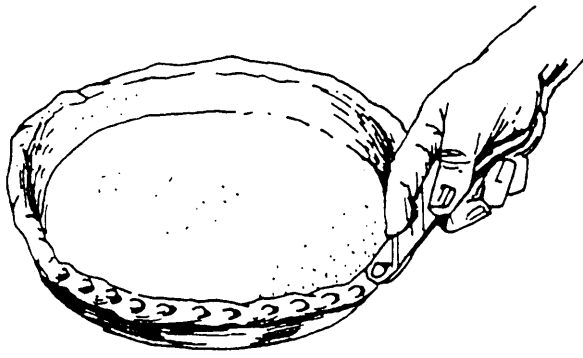


**Coin:** Trim pastry even with edge of pan. Cut 3/4-inch circles from rolled pastry-use center of doughnut cutter or thimble. Overlap circles on slightly moistened rim; press down lightly. (For one-crust pies only.)

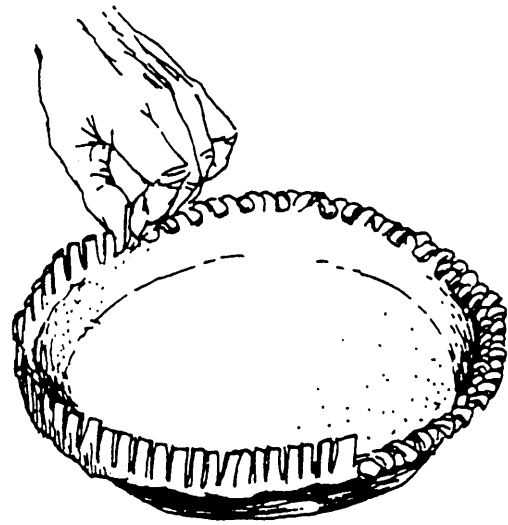


**Cornucopia:** Allow 1-inch additional overhang; do not turn under or make rim. With scissors, cut overhang into triangles at 1-inch intervals. Roll points in toward rim. Seal "cornucopias" on inner edge. (For one-crust pies only.)

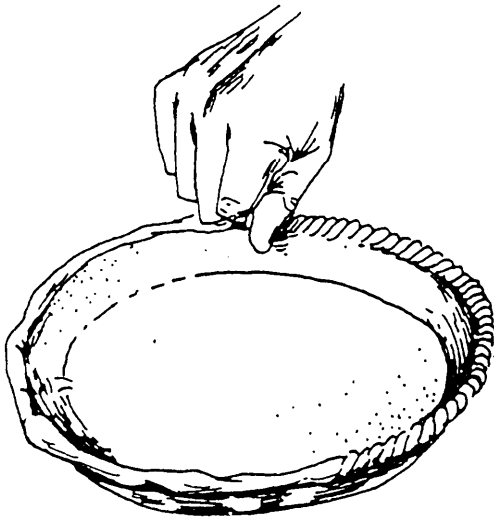
**Figure 8-4.—Making crusts for one-crust pies.**



**Polka Dot:** Allow 1/2-inch overhang; fold under and form a rim. Press rounded end of bottle opener firmly into pastry rim. Repeat around outside rim.



**Leaf:** Form a high standing rim. With scissors, clip rim at an angle every 1/4-inch. Press down clipped rim alternatively to right and left.



**Rope:** Form a standing rim. Place thumb on pastry rim at an angle; press pastry against thumb with knuckle of index finger.



**Fork Scalloped:** Form standing rim. Mark edges every 3/4-inch as for fluted edge. Flatten rim to edge pan between points with floured fork.

**Figure 8-4. Making crusts for one-crust pies—Continued.**

up or crack. After baking the shell, you should fill with the appropriate filling. Examples are coconut cream and chocolate cream pies.

**DOUBLE-CRUST PIES.**— The bottom crust is filled with pie filling. The piecrust rim is brushed with

water. Before placing the top crust on the filling, several small slits should be made in the top crust to allow steam to escape. The top crust should be folded in half for ease in handling, then placed on the pie filling. Unfold it carefully to prevent the crust from tearing. The edges of the piecrust are pressed lightly together. The excess

dough is then trimmed. The pie may be fluted in the same manner as one-crust pies. If a finish or glue is desired, the pie top may be sprinkled lightly with sugar or brushed with pie wash. Select the pie wash that is applicable to the type of pie being prepared.

**PIECRUST VARIATIONS.**— The AFRS has recipes for other piecrusts using graham crackers. Graham cracker crusts may be prepared from either crushed graham crackers, granulated sugar, and melted butter or prepared ready-to-use graham cracker crust.

### Pie Fillings

Pie fillings may contain either fruit or cream. Some pie fillings are already prepared.

**PREPARED PIE FILLINGS.**— Prepared pie fillings are convenient to use as they require no preparation. The required amount of filling is poured into an unbaked pie shell. Apple, blueberry, cherry, and peach are the varieties available. For further information, see the AFRS cards for prepared pie fillings.

**FRUIT.**— Fruit fillings, except those using pregelatinized starch or canned prepared pie fillings, are cooked before being placed in an unbaked piecrust. If recipe instructions are carefully followed, the filling will be properly thickened and cut edges of the pie will ooze slightly. The pieces of fruit will look clear and distinct and the color will be bright. The AFRS gives information on ingredients used to thicken pies.

**CREAM FILLINGS.**— The AFRS has basic recipes for chocolate and vanilla cream pie fillings. Cream fillings should be smooth, free from lumps, and rich in appearance. The fillings should never be boiled. Boiling will cause curdling. If fruit is to be added, follow the recipe directions carefully to avoid a thin, runny filling. Follow the AFRS procedure to prevent this from occurring. Once the pie filling has been prepared, pour it into a baked piecrust and top with the desired topping.

Instant pudding mixes are available for making cream filling. They require no cooking. Available in chocolate, butterscotch, and vanilla flavors, they are designed to be prepared with nonfat dry milk and water. Chocolate mousse pie is prepared from instant pudding to which whipped topping is folded in to make a rich pie filling.

**PUMPKIN.**— Pumpkin pie filling is a custard-type filling to which pumpkin and spices are added. The filling is added to the unbaked crusts and baked. Note

that the pumpkin mixture for the filling should set 1 hour before adding the eggs. If not, the full amount of absorption will not take place and the filling will shrink and crack during baking.

Cream or custard fillings are highly susceptible to the formation of bacteria that cause food-borne illness. Never hold custard or cream fillings between 40°F and 140°F longer than 4 cumulative hours. Always keep cream pies refrigerated until they are served.

**LEMON.**— The AFRS lemon pie filling recipe specifies water rather than milk as the liquid. Lemon juice is the flavoring and should be added after the filling is cooked. If the lemon juice is added while the filling is cooking, it will prevent the mixture from thickening. Prepared, canned lemon pie filling is also available. The filling is ready to use and requires no cooking unless it is to be topped with a meringue. In that case, the pie filling should be heated to 122°F before pouring it into the baked piecrust. Dehydrated lemon pie filling mix is available. When mixed with water, it is ready for filling piecrusts. Follow manufacturer's preparation instructions.

**CHIFFON.**— Lemon, pineapple, and strawberry chiffon pie fillings are made easily by combining whipped topping with flavored dessert powder gelatin that has been beaten slightly after it has thickened. Well-drained fruits such as strawberries or pineapple are added. The filling is poured into a baked pie shell. Another variation of chiffon pie can be prepared by using fruit-flavored gelatin cubes of different colors mixed with whipped topping.

**OTHER FILLINGS.**— Pecan, mincemeat, and sweet potato pie fillings may be prepared for pie filling variations. These fillings are poured into unbaked pie shells and baked according to AFRS recipe directions.

### Pie Toppings

Meringues, whipped cream, and whipped toppings are most often used as toppings to attractively garnish cream pies.

**MERINGUES.**— Meringues are generally used for topping cream or lemon pies. Meringues are made with egg whites, sugar, vanilla, flavoring, and salt. They must always be baked.

Dehydrated meringue powder is made from egg albumen, powdered sugar, cornstarch, flavoring, salt, phosphates, sulfates, dextrose, and stabilizers. It requires only the addition of sugar and water. Once

dehydrated, it should be spread over the filling and baked in the same method used for fresh meringue.

**OTHER TOPPINGS.**— Toppings for pies maybe a slice of processed American cheese or a scoop of ice cream to top apple pies. The AFRS has a large selection of frostings, fillings, and toppings.

### Cutting and Serving

Pies should be cut into eight serving-size portions. Pies may be placed on individual plates for self-service from the dessert bar. Pies should be placed for service so that the point of the pie slice faces the front of the serving line. Turnovers, dumplings, fried pies, and cobblers should be served in a similar manner as pies.

### Pastry

There are several types of pastries that are included in the AFRS. These are cobblers, turnovers, dumplings, and fried pies. Ready-to-use puff pastry dough, in sheets, is available. It is used with fruit fillings as a dessert. It can also be used with meat fillings and served as an entrée.

**COBBLERS.**— Cobblers are pies that are baked in sheet pans instead of pie pans. Cobblers maybe varied by topping the filling with pie dough cut into small dollar-sized circles or other shapes, or by using a streusel topping. Cobbler-style pies take less preparation time than the regular type of pies. Directions for preparing cobblers are provided in the AFRS.

**TURNOVERS, DUMPLINGS, AND FRIED PIES.**— Piecrust and fruit fillings are used according to the directions in the AFRS to make turnovers, fried pies, and dumplings. For turnovers and fried pies, the dough is rolled into a rectangle and cut into squares, then folded over and sealed. Turnovers are folded into triangles and baked. Fried pies are usually cut into semicircles and then deep-fat fried. Dessert dumplings are formed by the four points of the rectangle being pulled up to the center and then sealed. They are served warm with a dessert sauce (such as caramel).

### OTHER DESSERTS

Besides cakes and pies, there are various other types of desserts used in the GM.

### Fruit Desserts

Fruit-flavored gelatins, fruit crisps and crunches, baked apples, fruit cups, and fresh, canned, frozen, or dried fruit provide additional dessert variety.

**FRUIT GELATIN.**— Gelatin desserts are light, simple to prepare, colorful, and economical to serve. They may be plain, fruit-flavored gelatin served with a whipped topping or a gelatin and fruit mixture. Available flavors are cherry, lemon, lime, orange, raspberry, and strawberry. Follow the commercial directions on the container for the gelatin being used.

When adding fruit to gelatin, the juice drained from the fruit can be used for part of the water specified in the recipe. Using only the fruit juice will make the gelatin too sweet and may cause it to be too soft. The fruit should be well drained. Slice, dice, halve, or quarter the fruit before adding it to the slightly thickened gelatin. Fresh pineapple should be cooked before it is added to gelatin desserts as it contains an enzyme that will prevent gelatin from setting. Canned pineapple is a cooked product and, therefore, may be used without cooking.

Keep gelatin desserts refrigerated until served. Holding them on the serving line for long periods of time may cause them to melt. Gelatin desserts that are prepared in decorative molds can be unmolded easily by dipping the container in lukewarm water for a few seconds to loosen the gelatin from the bottom and sides. Individual portions can be cut with a sharp knife and a spatula used to lift out the portions for service. Gelatin desserts may be garnished with whipped toppings.

**FRUIT CRISPS AND CRUNCHES.**— Fruit crisps and crunches are baked fruit desserts prepared from canned or dehydrated fruits (for example, apples, peaches, pineapple, and red tart cherries). Crunches may be also made by using canned, prepared fruit pie fillings. Crisps and crunches are topped with mixtures such as buttered crumbs, oatmeal, oatmeal cookie mix, or cake mix. Cinnamon and nutmeg are added to cooked apple dessert crisps for flavor.

**BAKED APPLES.**— Baked apples are prepared from fresh whole, unpeeled, cooking-type apples that have been cored. A cinnamon-flavored sugar and butter syrup is poured over the top before baking. The apples may be filled with a raisin nut or raisin coconut filling if desired. Serve the baked apples warm. Whipped cream, whipped topping, or a scoop of ice cream may be added just before serving.

**FRUIT CUPS.**— Fresh, frozen, and canned fruits can be combined to make eye-appealing desserts. Ambrosia is a fruit cup to which coconut has been added. Seasonally available melons, such as cantaloupe, watermelon, honeydew, and honeyball melons, give extra variety to fruit cups.

**FRESH, CANNED, AND FROZEN FRUIT.**— Seasonally available fresh fruits and the readily available fruits such as apples, oranges, grapefruit, and bananas can complete a meal when offered as dessert. They offer an alternative to weight-conscious dining patrons who want to avoid the high-calorie desserts. Canned and frozen fruits may be served as simple desserts. Fresh pineapple may be cut into pieces and served as a dessert fruit. See the section on salads for preparation.

### Custards and Puddings

Custards and puddings containing milk and eggs must not be held at temperatures between 40°F to 140°F for more than 4 cumulative hours. These desserts are extremely susceptible to rapid bacteria growth that causes food poisoning. Keep them chilled until they are served.

**CREAM PUDDINGS.**— Cream puddings may be prepared from the basic recipes or from instant dessert powder pudding mixes. Ready-to-serve pudding in chocolate and vanilla flavors is also available. Those products may be spooned into serving dishes or used as pie fillings in baked piecrust shells or graham cracker or cookie crusts. For information on puddings, see the section on cream pie fillings. Sliced bananas, orange sections, crushed pineapple, or coconut may be added for variations.

**TAPIOCA PUDDING.**— Tapioca pudding is similar to cream pudding except tapioca is used as the thickening agent instead of cornstarch. Tapioca pudding should not be heated to a boiling temperature. High heat causes the pudding to be thin and runny. Follow the AFRS directions. Garnishes, toppings, and sauces should be chosen to complement the flavor and color of the custard or pudding.

**BAKED CUSTARD.**— Baked custard contains milk, sugar, eggs, flavoring, and salt. It is baked until the custard is firm. The custard is done if a knife slipped into the center is clean when removed. The custard should be refrigerated until it is served.

**BREAD PUDDING.**— Bread puddings are economical to serve since they allow leftover bread to

be used. Because of the custard base, these puddings must be kept thoroughly chilled. Chocolate chips or coconut may be added instead of raisins.

**RICE PUDDING.**— The AFRS includes recipes for both baked and creamy rice puddings. Creamy rice pudding is prepared in a similar manner as cream pudding. The rice should be cooked before it is combined with the other custard ingredients. Coconut or crushed drained pineapple and chopped maraschino cherries may be substituted for raisins. Since it is a custard, rice pudding must be continuously refrigerated.

**CAKE PUDDINGS.**— Some cake puddings separate while baking into a layer of cake over a layer of pudding (such as chocolate cake pudding). Other types of cake puddings differ in that fruit is mixed with or placed over a cake batter before baking. Fruit cocktail pudding is an example

### Cream Puffs and Eclairs

Cream puffs are round pastries that expand while baking, becoming hollow in the center. Eclairs have the same ingredients but are oblong rather than round. Cream puffs and eclairs are made by first stirring general-purpose flour into a melted butter and boiling water mixture, then cooling the mixture slightly. Unbeaten eggs are added to the mixture a few at a time and the mixture is beaten until it is stiff and shiny. Cream puffs and eclairs should be baked immediately. During the last few minutes of baking, the oven door should be opened. This will prevent them from becoming soggy and falling when removed from the oven. Cream puffs and eclairs are filled with chilled pudding, whipped cream, or ice cream. Powdered sugar may be sprinkled on top or they may be served with chocolate sauce. Cream puffs and eclairs may also be filled with tuna, shrimp, or salmon salad mixtures, or chicken a la king.

### Ice Creams

Ice cream and sherbet are popular desserts. The kinds that are used in the GM are commercially prepared ice cream and sherbet and galley-prepared soft-serve ice cream and milk shakes.

**COMMERCIALY PREPARED ICE CREAM AND SHERBET.**— Ice cream and sherbet are available commercially in various container sizes—bulk, slices, and individual cups. Ice-cream novelties that may be procured include ice-cream bars, cones, sandwiches, and fruit-flavored ices on a stick.

**SOFT-SERVE ICE CREAM AND MILK SHAKES.**— Galley-prepared ice-cream mixes greatly simplify making soft-serve ice cream and milk shakes. The kinds available are dehydrated ice milk-milk shake mix, fresh liquid ice milk mix, and fresh liquid milk shake mix.

**Dehydrated Ice Milk-Milk Shake Mix.**— Soft-serve ice cream and milk shakes, chocolate and vanilla flavors, may be made from dehydrated ice milk-milk shake mix. The mixes are combined with 40°F to 60°F water using a wire whip. Once reconstituted, they are very perishable. Keep refrigerated until ready to use. The mixture should not contain any lumps because they will clog the freezer. After mixing, chill the mixture to 35°F to 40°F and pour it into the freezer. Do not add a warm mixture to the freezer. Start the dasher motor and then the refrigeration. Freeze the ice cream to 18°F to 22°F or until it is stiff when it is drawn off.

When preparing milk shakes, the method of preparation is the same; however, the milk shake is frozen to 27°F to 30°F.

**Fresh Liquid Ice Milk Mix.**— Soft-serve ice cream may be prepared from fresh liquid ice milk mix that is available from local dairy contracts. The mix is available in chocolate, vanilla, and fruit flavors. Fresh liquid ice milk mix is ready to use. No water is required.

**Fresh Liquid Milk Shake Mix.**— Milk shakes in chocolate and vanilla flavors may be prepared from fresh liquid milk shake mix. This mix is intended for use in milk shake mix machines, but may be prepared in a soft-serve ice-cream machine if the other is not available. A slightly slushier product will be made.

Both of the fresh, liquid mixes are perishable and should be kept chilled at all times.

For cleaning soft-serve and milk shake machines, check the manufacturer's instructions.

## Yogurt

Plain and fruit-flavored yogurts are available. A vanilla or fruit-flavored yogurt mix for use with the soft-serve ice-cream machine is also available. See AFRS card for preparation instructions.

## SAUCES

Some fruit sauces served with desserts such as cake, puddings, and ice cream are thickened with cornstarch or pregelatinized starch. Prepared pie fillings that are thinned with water can be used to make quick and easy fruit sauce toppings for ice cream.

Galley-prepared caramel sauce does not contain cornstarch or other thickeners. It is thickened by cooking the sauce until it reaches the soft ball stage (235°F). Chocolate sauce is prepared by combining milk with a cooked paste made of sugar, cocoa, salt, and water and then cooked. Butter and flavoring are then added. These sauces may be served over ice cream or plain cake cut into serving portions.

Vanilla sauce is served with cakes, puddings, and pastry dumplings. Cornstarch or pregelatinized starch is used for thickening. When cornstarch is used, the sauces should be cooked to thicken and to eliminate the raw starch taste.

Cherry jubilee sauce, a sauce prepared from dark sweet, pitted cherries, cornstarch, sugar imitation brandy flavoring, and water, may be prepared to serve warm over vanilla ice cream or for serving cold over vanilla pudding or plain, unfrosted yellow or white cakes.

A variety of flavorings such as imitation wild cherry, black walnut, brandy, rum, almond, orange, lemon, and banana are available for use in dessert toppings and sauces. They may be substituted for vanilla flavoring in vanilla sauce and used as specified in other recipes.

